IN THE CLAIMS

1. (Currently Amended) An apparatus comprising:
an electrochemical cell electrically conductive support comprising
an electrically and thermally conductive core comprising an active area; and
an electrically and thermally conductive polymeric composite substantially covering the active area of the conductive core.

2. (Currently Amended) The~~An~~ apparatus according to Claim 1, wherein the electrically and thermally conductive core comprises a metal or metal alloy.

3. (Currently Amended) The~~An~~ apparatus according to Claim 2, wherein the metal or metal alloy is selected from the group consisting of aluminum, copper, magnesium, and combinations thereof.

4. (Currently Amended) The~~An~~ apparatus according to Claim 1, wherein the electrochemical cell electrically conductive support additionally comprises at least one channel for conducting a fluid.

5. (Currently Amended) The~~An~~ apparatus according to Claim 4, wherein the at least one channel is an exterior channel for conducting a fuel gas, a fuel liquid, an oxidant gas, or an oxidant liquid.

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6. (Currently Amended) The~~An~~ apparatus according to Claim 4, wherein the at least one channel is an interior channel for conducting a cooling fluid.

7. (Currently Amended) The~~An~~ apparatus according to Claim 1, wherein the conductive core additionally comprises a heat transfer area extending beyond the active area.

8. (Currently Amended) The~~An~~ apparatus according to Claim 7, wherein the heat transfer area is in the form of a cooling fin.

9. (Currently Amended) The ~~An~~ apparatus according to Claim 1, wherein a thermal coefficient of expansion of the conductive core is substantially the same as a thermal coefficient of expansion of the electrically and thermally conductive polymeric composite, over an operative temperature range of the ~~fuel~~electrochemical cell.

10. (Currently Amended) The~~An~~ apparatus according to Claim 1, wherein a volume resistivity of the electrochemical cell electrically conductive ~~polymer~~ support is less than about 0.5000 ohm-cm.

11. (Currently Amended) A system comprising:
a plurality of electrochemical cell electrically conductive supports supporting a plurality of fuel cell membranes, wherein at least one of the supports comprisesing:
an electrically and thermally conductive core comprising an active area; and
an electrically and thermally conductive polymer composite substantially covering the active area of the conductive core;
a gas supply means for supplying fuel gases and oxidant gases to the fuel cell membranes;
an electrical means for transporting electrical charge to and from the plurality of fuel cell membranes;
an electrical means for conditioning power produced by the plurality of fuel cell membranes; and
a control means for controlling the fuel gases, oxidant gases, and electrical means.

12. (Currently Amended) ~~A~~The system according to Claim 11, wherein at least one of the plurality of electrochemical cell electrically conductive supports ~~substrate has~~ an interior channels for channeling a cooling fluid.

13. (Currently Amended) ~~A~~The system according to Claim 12, further comprising means for supplying the cooling fluid to the interior channels.

14. (Currently Amended) ~~A~~The system according to Claim 11, wherein the conductive core additionally comprises a heat transfer area extending beyond the active area.

15. (Currently Amended) ~~A~~The system according to Claim 1~~1~~4, further comprising a means for supplying a cooling fluid to the heat transfer area.

16. (Currently Amended) ~~A~~The system according to Claim 15, wherein the cooling fluid is air.

17. (Currently Amended) An apparatus, comprising

an electrochemical cell electrically conductive support comprising

~~a~~an electrically and thermally conductive core comprising an active area; and

an electrically and thermally conductive polymeric composite substantially covering the active area and adhered thereto by an adhesion promoter.

18. (Original) The apparatus of Claim 17, wherein the adhesion promoter is a silane, titanate, or zirconate adhesion promoter.

19. (Currently Amended) The apparatus of Claim 17, wherein the conductive polymeric composite comprises an electrically conductive filler, whereinand all or part of the electrically conductive filler is in the form of fibers, platelets, or a combination of fibers and platelets.

20. (Original) The apparatus of Claim 17, wherein the conductive support has a volume resistivity of about 0.116 ohm-cm or less.

21. (Original) The apparatus of Claim 17, wherein the conductive support has a thermal conductivity of at least about 5 watts/meter °K.

22. (Currently Amended) The apparatus of Claim 17, wherein the conductive polymeric composite, when molded, has a linear shrinkage per unit length of the molded conductive polymeric composite in the X-Y plane of less than or equal to about 0.005.

23. (Original) The apparatus of Claim 17, wherein the conductive core comprises metals selected from the group consisting of aluminum, aluminum alloys, nickel, nickel alloys, copper, platinum, magnesium, magnesium alloys, titanium, gold plated metals, and stainless steel.

24. (Currently Amended) The apparatus of Claim 23, wherein the conductive polymeric composite is a polybutadiene- or polyisoprene-based composite.

25. (Currently Amended) The apparatus of Claim 24, wherein the adhesion promoter is chemically bonded with both the conductive core and the ~~conductive~~ polybutadiene- or polyisoprene-based composite.

26. (Original) The apparatus of Claim 24, wherein the adhesion promoter is a mercapto-functional silane or vinyl silane.

27. (Currently Amended) The apparatus of Claim 24, wherein the conductive polybutadiene- or polyisoprene-based composite comprises an electrically ~~a~~-conductive filler, a thermosetting polybutadiene or polyisoprene resin and an unsaturated butadiene- or isoprene-containing polymer capable of participating in cross-linking with the polybutadiene or polyisoprene resin during cure, and further wherein ~~the~~a volume to volume ratio of the polybutadiene or polyisoprene resin to the unsaturated butadiene- or isoprene-containing polymer is between 1:9 and 9:1, inclusive.

28. (Original) The apparatus of Claim 27, wherein the conductive polybutadiene- or polyisoprene-based composite further comprises a functionalized liquid polybutadiene or polyisoprene resin.

29. (Currently Amended) The apparatus of Claim 27, wherein the conductive polybutadiene- or polyisoprene-based composite comprises, based on ~~a~~the total volume of the composite~~coating~~, about 10 volume % to about 90 volume % of the filler.

30. (Original) The apparatus of Claim 27, wherein the filler is synthetic graphite.

31. (Original) The apparatus of Claim 27, wherein the conductive polybutadiene- or polyisoprene-based composite further comprises at least one monomer with vinyl unsaturation.

32. (Original) The apparatus of Claim 31, wherein the at least one monomer with vinyl unsaturation is selected from the group consisting of styrene, vinyl toluene, divinyl benzene, triallylcyanurate, diallylphthalate, and multifunctional acrylate monomers.

33. (Original) The apparatus of Claim 27, wherein the unsaturated butadiene- or isoprene-containing polymer is a copolymer of isoprene or butadiene and a second monomer.

34. (Currently Amended) The apparatus of Claim 33, wherein the unsaturated butadiene- or isoprene-containing copolymer is a solid.

35. (Original) The apparatus of Claim 33, wherein the unsaturated butadiene- or isoprene-containing polymer is a block copolymer.

36. (Currently Amended) The apparatus of Claim 35, wherein the unsaturated butadiene- or isoprene-containing polymer is a styrene-butadiene or a methyl styrene-butadiene di-block polymer.

37. (Currently Amended) The apparatus of Claim 35, wherein the unsaturated butadiene- or isoprene-containing polymer is a thermoplastic elastomer block copolymer having one of the formula

$X_m(Y\text{-}X)_n$,  , $W_p\text{-}(Z\text{-}W)_q$, or 

wherein in each formula Y is a block comprising isoprene or butadiene units; X is a thermoplastic block; ~~and~~ m and n represent the average block numbers in ~~said~~the copolymer, m being 0 or 1, and n being at least 1; ~~and~~ Z is a polyethylene or ethylene-propylene copolymer block; W is a thermoplastic block; and p and q represent the average block members in ~~said~~the copolymer, p being 0 or 1, and q being at least 1.

38. (Currently Amended) The apparatus of Claim 24, wherein the polybutadiene or polyisoprene ~~resin~~ has a molecular weight of less than 5,000.

39. (Currently Amended) The apparatus of Claim 23, wherein the conductive polymeric composite comprises an epoxidized phenol novolac resin, an epoxidized cresol novolac resin, polymers based on unsaturated vinyl esters, and combinations comprising at least one of the foregoing resins.

40. (Currently Amended) An electrochemical cell component comprising:

an electrically and thermally ~~A~~ conductive core; and

an electrically and thermally conductive polymer composite substantially covering and adhered to the conductive core by an adhesion promoter, wherein the electrochemical cell component has a volume resistivity of about 0.116 obm-cm or less.

41. (Original) The component of Claim 40, wherein the adhesion promoter is a silane, titanate, or zirconate adhesion promoter.

42. (Currently Amended) The component of Claim 40, wherein the conductive

polymer composite comprises an electrically conductive filler and all or part of the electrically conductive filler is in the form of fibers, platelets, or a combination of fibers and platelets.

43. (Currently Amended) The component of Claim 40, wherein the electrochemical cell component ~~conductive support~~ has a thermal conductivity of at least about 5 watts/meter °K.

44. (Currently Amended) The component of Claim 40, wherein the conductive polymer composite, when molded, has a linear shrinkage per unit length of the molded conductive polymer composite in the X-Y plane of less than or equal to about 0.005.

45. (Original) The component of Claim 40, wherein the conductive core comprises metals selected from the group consisting of aluminum, aluminum alloys, nickel, nickel alloys, copper, platinum, magnesium, magnesium alloys, titanium, gold plated metals, and stainless steel.

46. (Original) The component of Claim 45, wherein the conductive polymer composite is a polybutadiene- or polyisoprene-based composite.

47. (Original) The component of Claim 46, wherein the adhesion promoter is chemically bonded with both the conductive core and the conductive polybutadiene- or polyisoprene-based composite.

48. (Original) The component of Claim 46, wherein the adhesion promoter is a mercapto-functional silane or vinyl silane.

49. (Currently Amended) The component of Claim 46, wherein the conductive polybutadiene- or polyisoprene-based composite comprises an electrically conductive filler, a thermosetting polybutadiene or polyisoprene resin and an unsaturated butadiene- or isoprene-containing polymer capable of participating in cross-linking with the polybutadiene or polyisoprene resin during cure, and further wherein ~~the~~ a volume to volume ratio of the polybutadiene or polyisoprene resin to the unsaturated butadiene- or isoprene-containing polymer is between 1:9 and 9:1, inclusive.

50. (Original) The component of Claim 49, wherein the conductive polybutadiene- or polyisoprene-based composite further comprises a functionalized liquid polybutadiene or polyisoprene resin.

51. (Currently Amended) The component of Claim 49, wherein the conductive polybutadiene- or polyisoprene-based composite comprises, based on a total volume of the composite, about 10 volume % to about 90 volume % of the electrically conductive filler.

52. (Original) The component of Claim 49, wherein the filler is synthetic graphite.

53. (Currently Amended) The component of Claim 49, wherein the conductive polybutadiene- or polyisoprene-based composite further comprises at least one monomer with vinyl unsaturation.

54. (Original) The component of Claim 53, wherein the at least one monomer with vinyl unsaturation is selected from the group consisting of styrene, vinyl toluene, divinyl benzene, triallylcyanurate, diallylphthalate, and multifunctional acrylate monomers.

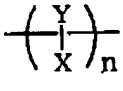
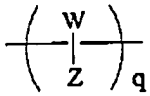
55. (Original) The component of Claim 49, wherein the unsaturated butadiene- or isoprene-containing polymer is a copolymer of isoprene or butadiene and a second monomer.

56. (Original) The component of Claim 55, wherein the unsaturated butadiene- or isoprene-containing copolymer is solid.

57. (Original) The component of Claim 55, wherein the unsaturated butadiene- or isoprene-containing polymer is a block copolymer.

58. (Original) The component of Claim 57, wherein the unsaturated butadiene- or isoprene-containing polymer is a styrene-butadiene or a methyl butadiene-butadiene di-block polymer.

59. (Currently Amended) The component of Claim 57, wherein the unsaturated butadiene- or isoprene-containing polymer is a thermoplastic elastomer block copolymer having one of the formula

$X_m(Y\text{-}X)_n$,  , $W_p\text{-}(Z\text{-}W)_q$, or 

wherein in each formula Y is a block comprising isoprene or butadiene units, X is a thermoplastic block, ~~and~~ m and n represent the average block numbers in the~~said~~ copolymer, m being 0 or 1, and n being at least 1; ~~and~~ Z is a polyethylene or ethylene-propylene copolymer block, W is a thermoplastic block, and p and q represent the average block members in said copolymer, p being 0 or 1, and q being at least 1.

60. (Currently Amended) The component of Claim 45, wherein the conductive polymer~~ic~~ composite comprises an epoxidized phenol novolac resin, an epoxidized cresol novolac resin, a poly(diallyl phthalate), and combinations comprising at least one of the foregoing resins.

61. (Currently Amended) An electrochemical cell component comprising:;

an electrically and thermally conductive core; and

an electrically and thermally conductive polybutadiene- or polyisoprene-based composite substantially covering and adhered to the core by an adhesion promoter, wherein the conductive polybutadiene- or polyisoprene-based composite, when molded, has a linear shrinkage per unit length of the molded conductive polymer composite in the X-Y plane ofis less than or equal to about 0.005.

62. (Currently Amended) An electrochemical cell component comprising:;

an electrically and thermally conductive core; and

an electrically and thermally conductive polybutadiene- or polyisoprene-based composite substantially covering and adhered to the core by an adhesion promoter, wherein the polymer composite comprises an electrically conductive filler in the form of fibers, platelets, or a combination of fibers and platelets.

63. (Currently Amended) An electrochemical cell component comprising:

a conductive core comprising a first side and a second side, wherein the first side comprises a first n-active area; and

a first electrically and thermally conductive polymeric composite substantially covering the first active area, wherein the first composite is molded to form a first channel.

64. (Currently Amended) The component of Claim 63, wherein the second side has a second active area substantially covered by a second electrically and thermally conductive polymeric composite molded to form a second channel.

65. (Previously Added) The component of Claim 64, wherein the first, second, or first and second polymeric composite is adhered to the conductive core by an adhesion promoter.

66. (Currently Amended) The component of Claim 63, wherein the first conductive polymeric composite comprises an electrically conductive filler selected from the group consisting of conductive metals, particles coated with conductive metals, carbon, and mixtures containing at least one of the foregoing fillers.

67. (Currently Amended) The component of Claim 636, wherein the electrically conductive filler comprises particles in the form of fibers, platelets, or a combination of fibers and platelets.

68. (Currently Amended) The component of Claim 63, wherein the conductive ~~support~~core has a thermal conductivity of at least about 5 watts/meter °K.

69. (Currently Amended) The component of Claim 63, wherein the first conductive polymeric composite has a linear shrinkage per unit length of the first molded composite in the X-Y plane of less than or equal to about 0.005.

70. (Previously Added) The component of Claim 63, wherein the conductive core comprises metals selected from the group consisting of aluminum, aluminum alloys, nickel, nickel alloys, copper, platinum, magnesium, magnesium alloys, titanium, gold plated metals, and stainless steel.

71. (Currently Amended) The component of Claim 63, wherein the first conductive polymeric composite comprises polybutadiene or polyisoprene.

72. (Currently Amended) The component of Claim 63, wherein the first conductive polymeric composite comprises a thermosetting polybutadiene or polyisoprene resin and an unsaturated butadiene- or isoprene-containing polymer capable of participating in cross-linking with the polybutadiene or polyisoprene resin during cure, and further wherein athe volume to volume ratio of the polybutadiene or polyisoprene resin to the unsaturated butadiene- or isoprene-containing polymer is between 1:9 and 9:1, inclusive.

73. (Currently Amended) The component of Claim 72, wherein the first conductive polymeric composite further comprises about 10 to about 90 volume % of an electrically conductive filler, based on the total volume of the first conductive polymeric composite, ~~volume~~.

74. (Previously Added) The component of Claim 73, wherein the filler comprises synthetic graphite.

75. (Currently Amended) The component of Claim 63, wherein the first conductive polymeric composite comprises an epoxidized phenol novolac resin, an epoxidized cresol novolac resin, a poly(diallyl phthalate), or combinations comprising at least one of the foregoing resins.

76. (Currently Amended) A method of making an electrochemical cell component, the method comprising

coating an adhesion promoter on a conductive core comprising an active area; and

molding an electrically and thermally conductive polymeric composite onto the core at least partly over the coated adhesion promoter to form a molded polymeric composite, wherein the~~said~~ molding further forms at least one channel in ~~said~~the molded polymeric composite.

77. (Currently Amended) An electrochemical cell component comprising

~~----------~~a conductive core comprising a first side and a second side, wherein the first side comprises ~~an~~ first active area; ~~and~~

a first electrically and thermally conductive polymeric composite substantially covering the first active area; and

~~at least one~~ channel formed in the first ~~said~~ polymeric composite, the ~~said at least one~~ channel being non-conformal to the underlying conductive core.

78. (Previously added) The component of Claim 77, wherein the second side has a second active area substantially covered by a second electrically and thermally conductive polymeric composite having at least one channel that is non-conformal to the underlying conductive core.

79. (Previously Added) The component of Claim 78, wherein the first, second, or first and second polymeric composite is adhered to the conductive core by an adhesion promoter.

80. (Currently Amended) The component of Claim 77, wherein the first conductive polymeric composite comprises an electrically conductive filler selected from the group consisting of conductive metals, particles coated with conductive metals, carbon, and mixtures containing at least one of the foregoing fillers.

81. (Previously Added) The component of Claim 80, wherein the conductive filler comprises particles in the form of fibers, platelets, or a combination of fibers and platelets.

82. (Currently Amended) The component of Claim 77, wherein the conductive coresupport has a thermal conductivity of at least about 5 watts/meter °K.

83. (Currently Amended) The component of Claim 77, wherein the first conductive polymeric composite, when molded, has a linear shrinkage per unit length of the molded composite in the X-Y plane of less than or equal to about 0.005.

84. (Previously Added) The component of Claim 77, wherein the conductive core comprises metals selected from the group consisting of aluminum, aluminum alloys, nickel, nickel alloys, copper, platinum, magnesium, magnesium alloys, titanium, gold plated metals, and stainless steel.

85. (Currently Amended) The component of Claim 77, wherein the first conductive polymeric composite comprises polybutadiene or polyisoprene.

86. (Currently Amended) The component of Claim 77, wherein the first conductive polymeric composite comprises a thermosetting polybutadiene or polyisoprene resin and an unsaturated butadiene- or isoprene-containing polymer capable of participating in cross-linking with the polybutadiene or polyisoprene resin during cure, and further wherein ~~the~~a volume to volume ratio of the polybutadiene or polyisoprene resin to the unsaturated butadiene- or isoprene-containing polymer is between 1:9 and 9:1, inclusive.

A) 87. (Currently Amended) The component of Claim 86, wherein the first conductive polymeric composite further comprises about 10 to about 90 volume % of an electrically conductive filler, based on the total volume of the first polymeric composite. ~~volume.~~

88. (Previously Added) The component of Claim 87, wherein the filler comprises synthetic graphite.

89. (Currently Amended) The component of Claim 77, wherein the first conductive polymeric composite comprises an epoxidized phenol novolac resin, an epoxidized cresol novolac resin, a poly(diallyl phthalate), or combinations comprising at least one of the foregoing resins.